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A PECULIAR HABIT OF THE BLACK BASS.—I once observed a singular race between a Black Bass (*Micropterus dolomieu*), and a soft shelled Turtle (*Aspidochelys spinifer*) and her young. The first noticed was the old Turtle and her young swimming steadily up stream, turning neither to the right hand or to the left, (an unusual occurrence, so far as my observations extend,) and closely followed by a large Black Bass. Both the mother Turtle and her young appeared very much exhausted, and would very often come to the surface for air. The young Turtle, if not disturbed would swim close behind its mother, but the Bass, who was always hovering over or following a foot or so in the rear, would often make a lunge for the young one, and apparently bite it, which would cause it to instantly dart under its parent, and swim in this position until compelled to come to the surface to breathe. The young one finally became so exhausted and worried by the Bass, that at three different times it was observed to lay hold of the edge of its parent's shell with its mouth, and thus compel her to take it in tow. Not the slightest attention was paid to the young one by its parent.

Several times two or three Red Horse? (*Moxostoma macrolepidotum*), attempted to join in the chase, but was each time immediately driven away by the Bass. This performance was watched some time by me, and when the trio was last seen, the "play" was still going on.

We have at other times and in other places, observed this Turtle to be followed by Black Bass. This has also been observed by Dr. Kirtland, (Geological Survey of Ohio, Vol. IV, Zoology and Botany, P. P. 668—669.) Whether the Black Bass is a natural enemy of this species of Turtle, or what its real intention may be in so often following it, we are at present unable to say.—C. L. Webster.

ARCHÆOLOGY AND ANTHROPOLOGY.¹

ANTHROPOMETRY.—Anthropology in its literal sense is Man Science. It deals with the structure, history and development of men. The complexity of man in nature gives birth to many sciences. Some of these are old and some are new.

1. This Department is edited by Thomas Wilson Esq., Smithsonian Institution, Washington, D.C.

By their aggregation or consideration there was born a new science absorbing all the others, forming a harmonious whole, the substance of which is the natural history of man, and the name, Anthropology.

Notice the complexity of the subject and when the science comes to be divided into its distinctive parts, each of which is large enough to form (and in times past some of these have formed) a science in itself and given ample scope to the student for a lifetime.

1. Antiquity of man.
2. Origin of man.
3. Man's place in nature.
4. The races of mankind.
5. Language.
6. Development of Civilization.
7. Anatomy and Physiology of man.
8. Anthropometry or the measurement of human attributes whether physical or mental.
9. Psychology and Biology.

In former times, Archæology, classic, or otherwise, assumed control over much that has now been absorbed in Anthropology. The distinction between the two sciences is at present well defined, and they are now represented by different organizations.

Folklore and numismatics are powerful aids to Anthropology, insomuch that the student of one involuntarily becomes interested in the others. I predict their final absorption by the larger and more comprehensive science.

Numbers 1, 2, 3 and 8 in the foregoing list are new sciences. Their names may not be new, but they have, within the past few years, outgrown their former surroundings—burst their shell, so to speak, and now have assumed a position as part of the great science of Anthropology. The novelty of the antiquity and origin of man will always render this study attractive. They will always find their students and devotees. They deal with, that which to us are the great mysteries of the universe; the Whence, the How, and possibly the Whither, of the Human Species.

But number 8 is in danger of neglect at the hands of scientists. It is not attractive. It requires the utmost precision and care. Its results must be recorded, with all their errors. These may be detected in future investigations, and thus return to torment their originator. The work consists largely of dreary wastes of figures carried out to fractions of thousands, registered in a (to us) foreign system—the metric; and what-

ever of interest it may have, that of comparison, either with its own race or with others, does not commence until the future. So it has come to be neglected ; but its importance to a study of Anthropology, which shall be at once scientific and valuable, cannot be overestimated. To the doubter of this proposition I propound the following question: How can you determine the different races of mankind except you consider the difference of size, color, form and capacity. And how can this be done without Anthropometry?

The number of divisions into which it has been proposed, at different times, and by different scientists, to separate mankind has ranged from two to sixty. The five great divisions which we were taught as children have been broken up and the later scientists have proposed but three, to which they have given Greek names signifying the particular attributes assigned to each group, instead of the geographical terms formerly employed.

Leucochroi—represented by the Europeans.

Mesochroi—by the Mongolian and American Indian.

Melanochroi (Huxley) or Æthochroi (Dallas)—by the Negro and Australian.

The basis on which this classification has been made is as follows:

1. Statue and comparative height of different parts of the body.
2. Color of skin.
3. Color of hair and eyes.
4. Index, Cephalic.
5. Index, nasal.
6. Cross section of hair.
7. Shape of nose, and in certain cases (to be determined after death), of the pelvis.

From these facts given in figures with the necessary precision, aided by a study of his language, the scientist determines to what division of mankind the individual who is under examination belongs. But I ask how can these facts be gathered except by use of Anthropometry?

This new science of Anthropometry has grown so that what was before unthought of, and perhaps supposed to be unattainable, is now within the commonest demands. The time was when the stature and weight of the human body, the diameter and cubic capacity of the human skull, and the weight of the brain, were about all expected from Anthropometry. But an extended consideration shows that there is little in the Science

of Ethnology, in the study of physical difference between the races of mankind or the individuals thereof, which Anthropometry may not aid in clearing or defining.

Think of the physical differences in the various races of mankind in the present day—take the Western Hemisphere, and beginning at the north, compare the physical differences susceptible of accurate measurement between the Eskimos, Aleuts, Innuits, the North American Indian, the Aztec, the Peruvian, the Patagonian. A moment's consideration will carry conviction that accurate measurement would go far in establishing the dividing line between these races. As to the like benefit among our present Indians, in deciding between different tribes, I offer no opinion, but in obtaining by Anthropometry their status as a race, for comparison with other races, and so fixing their relative position as an Ethnologic group, I have no doubt as to the benefit, and that the work if done would receive the approval of the scientific world. Especially is this true since the combination of the American Indian in the same grand division with the Mongolian. I know of no method, except by Anthropometry, that the comparison between these two peoples can be made with precision; or by which they can with certainty be assigned to the same grand division. This comparison cannot be made by the measurement of a few isolated cases in either continent. The measurement must be of groups of individuals sufficiently large and numerous to establish the peculiarities of the entire people.

This application of Anthropometry to the American Indian falls naturally to the scientist of the United States. None other can do it, and our national pride should say that none other be permitted to do it. If this is a proper work, and worth the doing, it should be done by us. We should here apply the Monroe doctrine of politics. If not done, it should not be because it was neglected, or forgotten; but because we decide it not to be worth the labor and expense, and in this we must justify ourselves in the eyes of the world.

I venture with diffidence the suggestion that the present tried corps of Ethnologic explorers among our Indians might add to their present field duties that of Anthropometry. The corps is already organized and the labor, trouble or expense would be but slight compared with what it would be if a new corps had to be organized. The expense would only be for instruments and tables. The men could receive instructions in the needed manipulations from competent professors before starting. With small practice they could soon master the art,

and learn to measure the human body with celerity and precision, and to record the results with certainty. Of course, the collating these results would be done after their return home by others. The proper professors would afterwards determine the conclusion established by this aggregation of facts.

So important has this science of Anthropometry been considered in Europe that one of the most studious, learned and enthusiastic professors of Anthropology in the world—he who probably stood nearest its head—Paul Broca, devoted himself principally to the study and practice of Anthropometry; he developed the system which bears his name, and his fame stands principally upon his services in this branch. The Société d'Anthropologie at Paris endorsed his system, published his instructions as its own, and now the world has almost entirely adopted it as the basis of Anthropometry. The necessity of uniformity is so apparent that each country, one after the other, has finally adopted the metric system of measurements, England, I believe the last.

This Société established, many years ago, a permanent course of lectures upon this subject; one each week during the scholastic year. Broca was the lecturer during his lifetime. This course is still continued and is now in the hands of Broca's successor, Dr. Manouvrier. Anthropometry is thus assigned a place equal in dignity with any other of the branches of the science.

Dr. Paul Topinard is now devoting himself to a work with a duration of many years, of making a chart of all France according to the color of the hair and eyes of the inhabitants. Mr. Francis Galton of London, has been engaged for years upon the work of "Hereditary Stature." He established an Anthropometric Laboratory at the Health Exhibition in London, 1883, where each individual could be measured, weighed and tested in all his parts, the record being furnished him and a duplicate being kept for scientific use, all for 3d. 10,000 people were measured. This system has been continued during subsequent exhibitions—the Fisheries, Colonies, Inventories, &c., and the South Kensington Museum has adopted it permanently. Mr. Galton reports that demands have been made from many places throughout the world for lots of machinery. I listened with much satisfaction to his address on this subject as President of the Anthropological Section of the British Association for the Advancement of Science at Aberdeen in 1885. He then stated the problem which he sought to elucidate; given a group of men, or a single man of any certain and known

stature, and ignoring every other fact, what may be the probable average height of the brothers, sons, nephews and grandchildren respectively, and what proportion of these will probably range between any two specified heights? He found the average height of man in Great Britain, at what he calls the "level of mediocrity" to be 5 feet $8\frac{1}{4}$ inches. He was able to transmute female to male heights by multiplying by 1.08, or as he says, to state it roughly, add one inch to each foot. He established the ratio of height between brothers, between father and son, uncles and nephews, between grandfathers and grandchildren, and calculated the probability for the future. He proved that with all the certainty of divergence in height in individual cases, there was a law which tended to bring the whole people towards their mean level—that the progeny of tall men grow shorter and that of short men taller. And he adds the important fact derived from his study of "Hereditary Genius," that the peculiarities of mankind, say of Genius, follow the same rule. This rule seems reasonable and wise, otherwise while the children of the good people would become "very, very good," yet those of the evil people would become even worse than "horrid," and as the evil are numerical by greater, the world, but for this rule, would soon be given over entirely to evil.

The Société d'Anthropologie at Paris has issued a full set of instructions adapted to nearly all parts of the world.

General instructions are printed with particular instructions for France, for Australia, Algeria, Peru, Senegal, Mexico, Chili, Sicily, the Red Sea, Cambodia, Central Asia, Maylasia, Madagascar, each separate, but together forming a volume of not less than a thousand pages. Travelers to any of these countries are recommended to provide themselves with these instructions and the necessary instruments, and take observations to be reported back to the Société. The same general course has been pursued by the principal societies in Europe. I will not attempt to give even a list of the reports made in accordance with these recommendations, such would be so incomplete that it would mislead rather than inform the reader. But it may be summarized by saying that about all we know *with certainty in figures* of the physical characteristics of the various peoples of the world we know from these sources.

I give a sample of the information thus received, a resumé of the report made by Surgeon H. B. Guppy of his visit to the Solomon Islands. He operated upon 72 natives and gives the tables of measurements in every part of the body. His resumé

of the physical characteristics of the average Solomon Islander is as follows: (*Anthrop. Institute*, Vol. XV, p. 281.) "Such a man would have a well proportioned physique, a good carriage and well-rounded limbs. His height would be about 5 feet, 4 inches; his chest girth between 34 and 35 inches and his weight between 125 and 130 pounds. The color of his skin would be a deep brown, corresponding with number 35 of the color-types of M. Broca. * * * The form of his skull would be Mesocephalic. The proportion of the length of the span of the extended arms to the height of the body, taking the latter as 100, would be represented by the index 106.7. The length of the upper limb would be exactly the one-third the height of the body, and the tip of his middle finger would reach down to a point about $3\frac{1}{2}$ inches above the patella. The length of the lower limb would be slightly under one-half 49-100 of the height of the body, and the relations of the lengths of the upper and lower limbs to each other, would be represented by the intermembral index 68.

I grant at once that there are other branches of Anthropology in the United States which have pressing needs for study. The Indian is said to be in progress of extinction like the buffalo, and unless he can be studied soon, in his language, art and industry, it will be too late. This argument for immediate action is all powerful, and should move the United States to all possible exertion. But I submit that it applies with equal force to Anthropometry. If not now, or soon, measured in their groups of tribes, it will be too late. Extinction or mixture of blood between different tribes or with whites would be equally fatal to Anthropometry.

Some of those who have studied the subject most, believe in an identity of race between the North American Indian and the mound-builders of prehistoric times. Anthropometry would be a powerful assistant in proving the fact.

I should much like to see Anthropometry practised upon our native tribes, whether Eskimo, Innuït or Indian, now while we have such splendid opportunities, by means of numerous examples and continued tests so extended and applied to groups of sufficient numbers, as that the physical peculiarities and attributes of each race or tribe might be established upon a scientific basis with mathematical accuracy, and which would be so complete as to be accepted by all the world. For this great subject the United States possesses peculiar facilities.

These would furnish means of comparison between them and all other tribes, races and peoples, whether modern,

ancient or prehistoric. I have wondered often that this most feasible and certain evidence has never been sought by the believer in identity of the North American Indian with the lost tribes of Israel.

The prehistoric race of men in Europe and America belonging to the paleolithic age—the river drift man and the cave dweller—were of much greater antiquity than the mound-builders of the United States, and the savants of Europe seem now to be of the mind that he passed, whether by land or sea is immaterial, to America, and that the Western Hemisphere is peopled from this stock. They think they can trace similarities of implement, art and industry in the present race of Eskimos. How much it would add to the solution of the question to have the physical status of each and all these tribes settled by Anthropometry.

The scientific value of anthropometry is for comparison between different individuals, or tribes, or races of people. In order to accomplish this comparison the measurement must be accurate and done by the same system among all nations. If different systems be employed, the comparison cannot be made with certainty. The tendency of the American mind to invent new systems should be here repressed and we should adopt as universal the metric system of measurement.

ANCIENT MOUNDS AT FLOYD, IOWA.—On the west side of the Cedar River, one half mile east from Floyd, Iowa, are located a group of three ancient mounds. These mounds, instead of being located on the highest eminence in the region, as is most usually the case, are arranged in a slightly curved line, on a high but level space, fifty feet above, and two hundred and twenty yards back from the stream, and midway between two points (from fifty to sixty rods from each) which face the river, and rise from twenty-five to fifty feet above this level space. The ground, between the mounds and the Cedar, has a rather gently sloping surface. At this point the stream makes a bend to the east, and the mounds thus occupy a position on the south side. The north side of the stream is occupied by a steep, and somewhat broken, wooded bank, which affords a limited though beautiful bit of scenery to this place.

This area, as well as the surface of the mounds themselves, was originally possessed by a heavy growth of timber, but which was cleared away more than twenty years ago and the soil kept under the plow ever since. These mounds are low and circular, and twenty feet distant from each other. The

east, or largest mound, is thirty feet in diameter, and was originally two feet high (so reported by Mr. Sharkey, who first cleared, and still owns the tract) although owing to degradation by the plow now rises only one and one half feet above the surface of the ground surrounding the mound. The two remaining mounds are smaller and lower than the first one. The third mound—there may be some slight doubt expressed regarding its origin, for the reason that in the south portion of it there is imbedded a drift boulder, weighing some seven or eight hundred pounds. This, however, may have been placed here by human hands in the long ago, or the mound may have been an intrusion upon the stone. A partial exploration of the two smaller mounds was made, but without discovering anything.

In making a thorough exploration of the larger mound, however, the remains of five human bodies were found, the bones, even those of the fingers, toes, etc., being, for the most part, in a good state of preservation. First, a saucer or bowl-shaped excavation had been made, extending down three and three-fourths feet below the surface of the ground around the mound, and the bottom of this macadamized with gravel and fragments of limestone. In the centre of this floor, five bodies were placed in a sitting posture, with the feet drawn under them, and apparently facing the north. First above the bodies was a thin layer of earth; next above this was nine inches of earth and ashes, among which was found two or three small pieces of fine-grained charcoal. Nearly all the remaining four feet of earth had been changed to a red color by the long continued action of fire.

All the material of the mound, above and around the bodies, had been made so hard that it was with great difficulty that an excavation could be made even with the best of tools. The soil around the bodies had been deeply stained by the decomposition of the flesh. The first (west) body was that of an averaged sized woman in middle life. Six inches to the east of this was the skeleton of a babe. To the north, and in close proximity to the babe, were the remains of a large, aged, individual, apparently that of a man. To the east and south of the babe were the bodies of two young, though adult persons. The bones of the woman, in their detail of structure, indicated a person of low grade, the evidence of unusual muscular development being strongly marked. The skull of this personage was a wonder to behold, it equaling, if not rivaling in some respects, in inferiority of grade, the famous "Neanderthal

PLATE VIII.

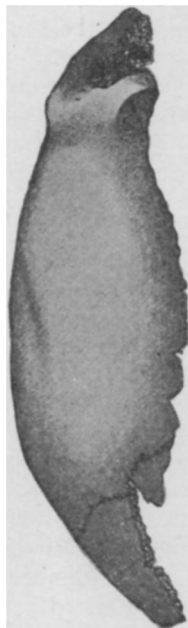


FIG. 1.



FIG. 2.

Fig. 1. A Lateral View of Skull of Mound Builder. Fig. 2. Front View of the Same. Both much reduced.

Skull." The forehead (if forehead it could be called) is very low, lower and more animal like than in the "Neanderthal" specimen. The two following cuts will illustrate this description.

This skull is quite small for an adult individual. The inner portions of the brow ridges are slightly prominent.

The distance from the lower portion of the nasal bone to the upper margin of the eye cavities is only four centimeters. A slight portion of this bone has, however, apparently been broken away.

The distance between the eye sockets at a point midway between the upper margin of the eye cavities and the lower portion of the nasal bone is two and three-fourths centimeters. Only that portion of the skull figured was found intact, the other portions being too much crushed by the weight of the earth from above to allow of a reconstruction of its parts. One of the jaws, containing well preserved teeth, was found. This was rather strong, but the teeth only moderately so. We were at first inclined to consider the strange form of this skull as due to artificial pressure while living, but a critical examination of it revealed the fact that it was normal, *i.e.*, not having been artificially deformed. The teeth of the babe were very small, and the skull thick, even for an adult person.

The next skeleton was that of a man nearly six feet in height. The crowns of all the teeth had been very much worn down, some of them even down to the bone of the jaw.

As before stated, the remaining bodies were those of young adult persons, the skull of one of which was small for a full-grown individual. No relics of any description were found with the human remains in this mound. This burial appeared to be a very ancient one, the limestone fragments in the floor of the excavation being nearly if not all decomposed.

In other mounds opened¹ on the same stream, at Charles City, six miles below, fragments of the same limestone was not infrequently found, but in no case was decomposition visible, except as a thin outer crust, although the human bones, which were usually more or less abundant, were in no case very well preserved, but on the contrary, often nearly or entirely decomposed. The fine preservation of the remains in the

¹ These mounds are thirty-one in number, an exploration of nearly all of which has been made by the writer and the results embodied in a paper soon to be published. A comparison of the method of burial practiced by the Mound Builders near Floyd, and by those of Johnson County, Iowa, (a description of which has been given by us in a paper on "Ancient Mounds in Johnson County, Iowa," and which has been in the hands of the printer for some time) will be of interest.

mound at Floyd was due to the method of burial. This being evidenced by the fact that over a small portion of one of the bodies the earth had not been so thoroughly packed, and as a consequence the bones were almost entirely decomposed away, while the other portion of the body over which the soil had been very firmly packed was well preserved. Judging from all facts gathered, it seems not improbable to suppose that this represented a family burial.

The question has been raised, "How was it that these five persons were all buried here at the same time, their bodies being still in the flesh?" As we have no reason to suppose that these ancient people possessed any means for preserving, for any length of time, in the flesh, the bodies of their dead; it seems plausible to suppose that these individuals were all swept off at about the same time by some pestilence, or else, upon the death of some dignitary of the tribe or people (perhaps represented by the remains of the old man) the other members of the family were sacrificed, similar to the custom which has prevailed among some ancient tribes or races of historic times.

On the same stream, a short distance below this mound, several other mounds occur which promise to yield interesting results, and which we purpose to explore as opportunity offers.
—CLEMENT L. WEBSTER, *Charles City, Iowa.*

MICROSCOPY.¹

THE EGGS OF PETROMYZON.²—1. Artificially fertilized eggs were treated with Flemming's fluid, containing a larger admixture of osmic acid than is prescribed in the original formula.

2. After 30 minutes the eggs were washed in distilled water, passed through 30% and 70% alcohol (3 hours in each), and preserved in 90%.

3. The eggs were cut in paraffine, the sections fixed to the slide with albumen, stained with safranin, and mounted in xylol balsam.

¹ Edited by C. O. Whitman, Director of the Lake Laboratory, Milwaukee.

² A. A. Böhm, *Arch. f. Mikr. Anat.*, xxxii. pp. 634-5.